sulfur in these catalysts primarily affects the ionic reactions of isomerization and cracking.

The sulfur content of the catalysts studied was varied either by changing the preparation conditions or by varying the degree of reduction of the sulfur in the fresh catalysts.

A portion (5–10%) of the non-stoichiometric sulfur is very difficult—or altogether impossible—to remove by a reducing treatment. However, this is exchangeable with radioactive sulfur, when the latter is added to the raw materials. It is believed that this portion of the sulfur is relatively permanently bonded to the catalyst surface and functions as an added acceptor to increase the proportion of positively-charged surface elements which accelerate the ionic reactions.

Oxidation of Xylols in Vapor Phase Over Copper Catalysts Containing Added Heavy Metal Oxides

By N. I. Popova, B. V. Kabakova

Institute for Petro- and Coal-Chemical Synthesis of the City of Angarsk

The results of oxidation of o-, p-, and m-xylols over copper catalysts containing added heavy metal oxides show that these reactions involve oxidation of the methyl groups only, resulting in the formation of o-, p-, and m-toluyl aldehydes. A study of the kinetics of oxidation of xylols in a continuous processing unit shows close proximity of the activation energy values for formation of carbonyl compounds (9–12 kcal/mol) and for CO_2 (20–30 kcal/mol).

Some of the principles are compared which are equally applicable to the reactions of oxidation of hydrocarbons to carbonyl compounds over copper catalysts, to autooxidation processes to form hydroperoxides, and to oxidation of hydrocarbons in liquid phase.

Dehydrogenation of Isopropyl Alcohol and of Formic Acid Over Germanium Metal

By V. M. Frolov, E. K. Radjablee

Institute of Chemical Physics of the Academy of Sciences of USSR

Dehydrogenation of isopropyl alcohol and of formic acid was studied over a finely divided surface of germanium metal made by grinding the metal in contact with the vaporized hydrocarbon feeds.

The results of the study show that the catalyst samples differing in conductivity property have about the same activity. This finding differs from the results of the earlier studies using samples of germanium metal which had been pretreated at high temperatures.

The paper lists the experimental values of specific catalytic activity of germanium metal.

Kinetics of Reactions Complicated by Autocatalysis

By L. M. Leetveen'yenko, A. F. Popov, V. I. Tokar'yev

Kharkov State University

Different methods to treat the results of kinetic measurements were investigated in second order reactions which are complicated by autocatalytic effects. Based on an analysis of the results, several best methods were chosen.

A parameter is proposed to characterize quantitatively the extent of the autocatalysis. Within stated limits, the parameter defines with satisfactory accuracy the constants of catalytic and noncatalytic processes.

Diffusion Kinetics of Bimolecular Solid Phase Reactions: Reactions of Immobil Centers With Mobil Components of a Heterophase

By Ya. S. L'yeb'yed'yev

Institute of Chemical Physics of the Academy of Sciences of USSR

With the aid of electronic computers, a system of kinetic equations was developed to describe bimolecular reactions between the immobile centers and a gas diffusing into a solid body (in this study, a cylinder of infinite height). Based on precise calculation of the effective reaction times, different limiting conditions are examined and simple correlations are derived to analyze certain experimental data.

The correlations derived are also used to analyze some of the experimentally-determined kinetic data for the reactions of free radicals from irradiated polymers with molecules from the gaseous phase.

Mass Spectra of Dissociated CH_4^+, CH_3^+, and CH_2^+ Ions and of Some Radicals

By S. E. Koopreeyanov

L. Ya. Karpov Physico-Chemical Institute

The dissociation spectra of CH_2^+ and CH_3^+ ions can be determined from that of CH_4^+ ion. Similarly, the mass spectra of CH_3, CH_2, and CH radicals can be calculated from the mass spectrum of methane.